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Discuss 2<sup>nd</sup> week of development

**Day 8:**

The blastocyst is partially embedded in the endometrium. The trophoblast is divided into two layers; cytotrophoblast and syncytiotrophoblast. The cytotrophoblast is the inner layer of cells and its cells divide and migrate to the syncytiotrophoblast. The syncytiotrophoblast is the outer multinucleated layer of cells which lacks cell boundaries.

The cells of the embryoblast also differentiate into two layers; Hypoblast and Epiblast. The hypoblast consists of small cuboidal cells adjacent to blastocytic cavity while the epiblast is a high layer of columnar cells adjacent to the amniotic cavity. Epiblastic cells are called amnioblasts.

The hypoblast and epiblast form a flat disc. A small cavity in the epiblast also appears and is called amniotic cavity. The cavity is lined by amnioblasts.

**Day 9:**

The blastocyst is deeply embedded in the endometrium. The penetration defect in the epithelium of endometrium is closed by fibrin coagulum. The trophoblast develops at the embryonic poles and vacuoles appear at the syncytium. The vacuoles fuse to form the lacunae and this phase is called the lacunar stage. Flattened cells from hypoblast form a thin membrane called the exocoelomic or Heuser membrane. The Heuser membrane lines the inner surface of cytotrophoblast and also forms lining of the primitive yolk sac.

**Day 11 and 12:**

The blastocyst is deeply embedded in the endometrium. Surface epithelium covers the defect almost completely while the blastocyst produces a protrusion in the lumen of uterus. Cells of syncytiotrophoblast penetrate the stroma and rupture the endometria capillaries called sinusoids. The lacunar spaces of the trophoblast form an intercommunicating network with the sinusoids and maternal blood enters the lacunar system to provide oxygen and nutrients for the embryo. This communication produces the primordial uteroplacental circulation.

New cells appear between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity. These cells form a loose connective tissue called extraembryonic mesoderm. Large cavities develop in the extraembryonic mesoderm, and they become confluent forming a new space, the extraembryonic cavity or chorionic cavity.

The chorionic cavity surrounds the primitive yolk sac and amniotic cavity, except where the germ disc connects to the trophoblast by the connecting stalk. The extraembryonic mesoderm lining the

cytotrophoblast and amnion is called the extraembryonic somatic mesoderm which forms the connecting stalk. There is a lining covering the yolk sac called the extraembryonic splanchnic mesoderm. The conceptus implants while the endometrial connective tissue cells undergo the decidual reaction. Decidual reaction occurs when the cells of the endometrium swell because of the accumulation of glycogen and lipid in their cytoplasm. They become polyhedral and are known as decidual cells. This reaction provides nutrition for the embryo.

**Day 13:**

The surface defect in the endometrium is completely covered by the surface epithelium. Bleeding may occur at the implantation site due to increased blood flow into the lacunar spaces. Exocoelomic cysts are often found in the chorionic cavity. The extraembryonic coelom expands and forms a large cavity called the chorionic cavity. The extraembryonic mesoderm lining the inside of the cytotrophoblast is then called the chorionic plate. The extraembryonic mesoderm traverses the chorionic cavity at the connecting stalk. With development of blood vessels, the connecting stalk becomes the umbilical cord.